able to gather together every night the meteorological observations made at 9 a. m. (Greenwich time) and publish his *bulletin* in the next morning's paper. The *map* was not published but was compiled and studied by himself individually. The similar work done in this country, the history of which has often been rehearsed, was evidently as little known to Glaisher as was his own work in America. It is but another and a most striking illustration of the simultaneous origin of many of the important discoveries and inventions that mark the progress of the human race throughout the world.

Regretting that we are not able to print the letter written by Professor Henry on June 5, we think ourselves fortunate in submitting the following reply by Mr. Glaisher:

13 DARTMOUTH TERRACE, BLACKHEATH, KENT, *July* 8, 1850.

MY DEAR SIR: In reply to your letter of June 5 I beg to say that I shall have great pleasure in sending you copies of the forms I use in collecting meteorological observations, and the results of my experience are entirely at your service. In your letter you have not indicated the channel through which you wish the papers to be sent, and, therefore, I shall forward them through the Royal Society.

With the papers I shall send you will find a few copies of an address of a new Society, which myself with a few gentlemen have formed. It is under the presidency of J. C. Whitbread, esq.

At the meeting of the council of this Society, held a few days since, I did myself the pleasure of reading the letter with which you have favored me, and it was resolved that a form for collecting observations, drawn up by myself, and now in the printer's hands, should be sent to you, and the council expressed a wish to cooperate with the Smithsonian Institution as far as possible. Hitherto, there has been no fund devoted to meteorology in England, and I have borne all the expenses, excepting that each gentleman has furnished himself with his instruments; government, however, has published the results in the reports of the Registrar General, some of which I send.

We hope now to collect much more information than I have hitherto done, and if the system adopted by you be similar to that adopted by us, their united results will be more valuable.

Among the forms sent you will find one very simple, and which is used daily at about 50 different railway stations at the hour of 9 a. m., Greenwich time. The different railway companies have agreed that the station masters shall take these observations, and that they shall be brought to London the same day, free of expense. The proprietors of a London newspaper, The Daily News, incur the expense of sending a messenger to the several railway termini at about 2 a. m., and all the returns thus collected are immediately printed, so that the weather of the day previous, at one time, all over the country and parts of Scotland are publicly known. On receiving the paper I lay all these returns on a map, using a long, narrow-headed arrow to indicate the direction of the wind, and other symbols for the other information, and thus daily I know the weather, direction of the wind, etc., the whole being exhibited to the eye. Several gentlemen, whose names you will see in a form headed "simultaneous observations taken at 9 a. m.," have agreed to cooperate with me, and to take all the observations taken by the railway station masters, as well as others, with their full sets of instruments. It is believed by these arrangements, that very important information, with respect to the passage of storms in particular, will thus be collected. I have already more than one year's observations and daily maps in an unbroken series.

Previous to commencing these observations I visited every station, determined its meridian, fixed a compass card, and instructed the station master, remaining with him till I felt certain he would take the observations well.

The method I have adopted with respect to the observations of general phenomena is first to superintend the making of the instruments, then their selection. I determine their index errors by carefully examining and comparing every instrument with a standard. I visit the different locations in which they are placed, and examine the positions of the instruments themselves.

On receiving the returns I first examine every one by itself; second, I divide them into groups, including the observations from one known good observer, and then I compare every result in every return with the corresponding result in the standard return, taking into account difference of elevation, etc.; next I form groups according to latitude, and another according to the longitude, by these means I usually detect any errors, and I believe very few escape. After this I proceed to their combinations, etc.

In future the British Meteorological Society intends having monthly returns, including every observation, and for which a form is now being set up, I shall, therefore, be more certain of the accuracy of the results.

I should be glad to have some arrangements made with the captains of steam vessels between America and England, thus connecting the observations taken in both countries, and I think this may ultimately be done.

I have the honor to be, Sir, with much respect and esteem,
Yours, very truly,

JAMES GLAISHER.

CAPTAIN DANSEY'S KITE FOR STRANDED VESSELS.

In the Transactions of the Society of Arts, Manufactures, and Commerce for 1825 a proposition was published which at the time received wide circulation, and which we recopy from the American Journal of Science and Arts for February, 1826, Vol. X, p. 184:

Captain Dansey, of the British Royal Artillery, proposes the employment of a kite to facilitate "communication with vessels stranded on a lee shore, or under other circumstances where badness of weather renders the ordinary means impracticable. A sail of light canvas or holland (being cut to the shape and adapted for the application of the principles of the flying kite) is launched from the vessel or other point to windward of the space over which a communication is required, and as soon as it appears to be at a sufficient distance a very simple and efficacious mechanical apparatus is used to destroy its poise, causing it to fall immediately, but remaining still attached by the line and moored by a small anchor, with which it is equipped." One end of the rope being thus conveyed to the shore and fixed by this small anchor, some one of the hands is enabled to get on shore and render assistance to others. The importance of the object is sufficient to recommend every expedient for its accomplishment. Captain Dansey is particular to recommend certain proportions for the construction of the kite. The canvas or holland is extended upon two spars whose lengths are to each other as two to three, the crosspiece intersecting the standard so that the upper section of the standard shall be to the lower section as one to two. At two points on the standard, about one-seventh of its length from the head and the same from the bottom, two lines are attached, the upper about one-sixth of the length of the kite and the lower two-thirds of its length, which combined form the bellyband, and to their point of junction is attached the line which is to retain the kite. The tail may be five or six times the length of the kite and its weight must be proportionate to the wind.

To effect the descent of the kite, the end of the line retained in the vessel is slipped through an apparatus, called the *messenger*, which, having a sail attached to it, is immediately taken up by the wind along the line toward the kite. This messenger, by driving out a wedge, which is essential for the proper poise of the kite, so transfers the center of suspension that a rapid descent of the kite and apparatus attached is a necessary consequence. Some experiments made with this instrument have given Captain Dansey much confidence in the success of his invention.

KERKAM'S KITES WITH ROCKET SIGNALS.

The military authorities of the world have developed several methods of utilizing the kite, as, for example, to raise on high an observer who wishes to overlook the neighboring country, or to elevate a string of signal flags, by means of which to communicate with distant friends. In the Louisiana Climates and Crops for July, 1896, Mr. R. E. Kerkam, the section director at New Orleans, says:

Three of the kites described in the MONTHLY WEATHER REVIEW for November, 1895, have been constructed here, two 44 inches high and one 88 inches high, the object of the latter being to find the lifting power and whether a system of rocket signals could not be fired therefrom at an elevation of about half a mile, using a time fuse for the firings. The Louisiana coast has no telegraph or telephone lines east or west of Port Eads, and the inhabitants are mostly ignorant fishermen, who will not take steps to repeat signals from one point to another. By a system of rocket signals, fired from the nearest towns to the coast, the rockets could be seen a long distance.

THE USE OF THE SEARCH LIGHT IN METEOROLOGY.

It was in December, 1872, that the Editor recommended to General Myer an easy method of determining the heights of clouds, and especially of the ill-defined stratus cloud. It was proposed to establish a search light whose beams should be vertical; the apparent altitude of the center of the luminous spot of the cloud was to be observed from a station not far away and the height was a matter of easy calculation. Since that time, and with the great increase in the power of the modern search light, further applications have become practicable; thus in harbors on the seacoast, where one wishes to ascertain the presence and development of low-lying fogs, the search light which renders them visible is an invaluable assistant. A year ago some accounts were published relative to the cloud effects on Mount Low and Pasadena. According to these accounts Mount Low is about 15 miles north-northeast from Los Angeles and about 6 miles in a straight line from Pasadena. When the beam of light fell upon the bodies of clouds they at once became luminous, so that all the details of motion were visible; when the beam fell upon the falling rain the great cone of light glowed like molten metal. Distant clouds moving up the canyons were searched out and made to glow as if in the midday sunshine. It seems as if the formation and motion of fog and cloud at nighttime could be advantageously studied by means of the search light. The height at which fog first forms, and its gradual extension upward and downward during the night, would be a very interesting and profitable investigation.

WATERSPOUTS OFF LONG ISLAND.

On April 9 when the schooner *George M. Grant* was within a few knots of Montauk Point, the sea, which had been heavy all along the Long Island coast from Fire Island, rapidly became the roughest that Captain Pelton had ever seen. It was about eight bells, or 4 p. m., and thick weather had prevailed all day. During a temporary lift in the clouds Captain Pelton and his crew saw ahead four immense waterspouts. Three of them were at a comfortable distance, but the fourth passed by to starboard not an eighth of a mile from the schooner. Captain Pelton says that the noise made by the spout as it whirled by the vessel was like that made by an immense cornsheller.

WATERSPOUT, CLOUDBURST, OR TORNADO.

These three terms are often used indiscriminately when it would be easy to make a clear distinction between them. The Cleveland World of April 1 reports that "a waterspout on March 31 at Pana, Ill., threw a train of five cars and engine from the track of the Illinois Central." It does not appear likely that the damage here mentioned was done by wind; we may, therefore, infer that we have not to do with a tornado. A waterspout at sea is, according to all established usages in the English language, a different phenomenon from a heavy rain. Rain often accompanies a waterspout, but is not the prominent and characteristic feature. In the present case there could have been no waterspout properly speaking because the phenomenon occurred over the dry land of the interior of the continent. The daily weather map shows that the conditions were favorable for the formation of severe rains, thunderstorms, cloudbursts, and possibly tornadoes over Illinois on the afternoon of March 31; in fact a tornado was reported in Arkansas, but not waterspouts properly so-called. The use of the word "waterspout," when the writer really means only a heavy rain and wind, is not to be recommended. Such rains and winds are characteristic of thunderstorms and so-called "cloudbursts." In the present case it is likely that rain did not alone do the damage that is reported; a flooded track and a strong current of water would be needed to throw an engine from the track, or possibly the flood caused by the rain had undermined the track and thus indirectly caused the derailment. In general, in such cases as this it would be more proper to omit the words "waterspout" and "cloudburst." If the train was thrown from the track, or lifted from the track, as the headlines of the above article had it, this must have been due to a severe storm, but certainly not to a "waterspout" properly so called.

THE CHARACTER OF THE SKYLIGHT.

It is generally recognized that the influence of the sunlight and diffused skylight on the assimilation and growth of plants is brought about, first, by the heat that warms the earth and promotes the rise of the sap and, second, by the chemical action that is brought about by certain portions of the solar spectrum or more properly by radiations of specific wave lengths which fall upon the leaves of the plants and determine the formation of chlorophyll. When plants are cultivated under the influence of artificial lights, or in portions of the earth where the sunlight is obscured by cloud and fog, their development is usually slower, and they oftentimes fail altogether to produce a satisfactory sap or crop, or mature seed. This failure is reasonably attributed to the nature of the light and especially to the relative abundance of the radiations that produce favorable chemical changes as compared with those that produce undesirable changes. Any investigation into the influence of climate on plants and crops and any effort to cultivate plants by artificial light must take into account the relative energies transmitted in different portions of the spectrum. This distribution of energy with wave length is extremely irregular when the flame is produced by burning simple substances, as is shown by the fact that the spectrum is generally a series of alternating bright and dark or warm and cold spaces, but is much more regular when the radiation emanates from incandescent masses of solids before they evaporate into the gaseous condition. The distribution of energy throughout the spectrum is also greatly affected by the reflection from any surface; especially is this true in the case of the blue light of the sky, which is apparently a species of selective reflection from the minutest particles of aqueous vapor and which, notwithstanding its visual feebleness, is yet a matter of the greatest importance to agriculture. The total amount of energy received by any plant from the whole vault of the blue sky will in hazy weather equal that received directly from the sun and in the case of a thin layer of cloud or fog when the sun is invisible and the direct radiation therefore zero, the indirect diffused radiation may still be a large quantity. This latter consideration suffices to explain why many plants flourish in a foggy and cloudy climate and in shady places where the direct sunlight never penetrates.

The total energy involved in the molecular vibrations that constitute radiation is not shown by its effect in producing light or heat or chemical actions; these are but some of the modes in which a portion of that energy becomes appreciable to us. This radiant energy is conveyed from point to point by the mediation of the ether, and the ether can only become appreciated by its action on the so-called ponderable matter. It is probable that the energy involved in the movements of the ether is far greater than that which is made measurable by its visual, chemical, or thermal results, for there are still other results accomplished by it, as shown by the phenomena of electricity, magnetism, and gravitation.

The following table is quoted from a paper in the *Annalen der Physik und Chemie*, Vol. LIII, by Koettgen, who has measured the relative intensity of the light in the different parts of the spectrum from a large variety of lamps and burning substances. Her measures of the sunlight and skylight particularly interest the meteorologist and agriculturist. They were made in the first half of August, 1893, near Berlin, Germany, in latitude N. 52°. At this season and place the maximum midday altitude of the sun varies from 56° on August 1 to 52° on August 15. The measurements were made by directing the vision toward the blue skylight at a considerable altitude above the horizon, and probably in the northern portion of the sky, although that is not specifically stated. The results are given in the first column. When directed toward an overcast sky covered by an apparently uniform thickness of cloud, the measurements given in the fourth column were obtained, and when directed toward the shining white side of a cumulus cloud, those in the fifth column. When directed toward the sun itself, the measurements given in the sixth and seventh columns were obtained. The figures given in